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appear to live. Where this sedge grows abundantly its runners are to be found crossing and recrossing beneath the surface, and careful excavation will show that many seemingly distinct plantlets belong to one system of underground stems. In some soils the plant grows more compactly than normally, and few runners are produced. In more favorable situations the runners are numerous, and many strike down diagonally into the earth, proceeding some inches before turning upward to the surface to bear a shoot.

The runners are at first clothed with closely imbricated scales or paleae arising from nodes all along the stem. These scales ultimately decay and become frayed into a coarse fringe, which remains appressed to the stem in whorls from every node.

In *Carex varia* we find a very different habit of growth. This species never produces running underground stems, and shows no disposition to spread, but grows in close tufts. Beneath the surface it develops a dense, knotty mass of small and closely aggregated rootstocks which bears a profusion of long fibrous roots. Year after year these rooty masses produce an abundance of new shoots, which rise from the surface amid the remains of the old. Each ultimate rootstock becomes the site for a cluster of compound shoots, and these secondary tufts, compacted together, make up the plant. A slight lateral prolongation of a shoot is sometimes necessitated by an obstruction in the most direct way to the surface, but this is the closest approach to subterranean spreading, and thus we find the plant forming neat, even-bordered tufts, there being no offshoots to mar the symmetry of outline.

In *C. Pennsylvanica* a slenderness of general habit is associated with a certain liberty of growth—a distribution of vital energy; in *C. varia* similar vegetative conditions are contracted, and somewhat modified in action, resulting in greater solidity of growth and increase in the size of parts. We may say that in the principle of growth of one we perceive decentralization, enterprise, advance in many directions; of the other, centralization, conservatism, unified strength. In none other of our species of *Carex* of the section *Montanæ* do we find the counterpart of the running underground stems of *C. Pennsylvanica*. The closest approach to them is shown by *Carex umbellata*. From its dense, matted tufts, this sedge occasionally puts off short underground stems. These, however, are more like suckers than running stems, and never stray from the main tuft, but merely aid in increasing its dimensions. *Carex pubescens* is of less tufted habit than any of the other species of this section, the shoots being irregularly produced by a progressive underground stem or rootstock. But this bears no resemblance to the running stems of *C. Pennsylvanica*, being rather stout, with short, irregularly-branched divisions. Our only other species, *Carex Emmonsii*, is of very similar underground growth to *C. varia*, the difference, in fact, corresponding to the general difference between the superterrene parts of the two plants.

Riverdale, N. Y. City.

EUGENE P. BICKNELL.

Survival of the Fittest.—When we use this expression it may be well to remember that accident has quite as much to do with fitness

as constitutional peculiarities. Where cattle are continually grazing, those tall growing plants which produce flowers only towards the ends of the branches extend amazingly if they happen to be distasteful to the animals. Plants of similar habit, if agreeable to cattle, cannot spread, because they are eaten off before they flower. Accidental introductions may thus be totally eradicated the first season, if annual—or confined to the original spot if a perennial plant. Thus, in Pennsylvania we have *Ranunculus bulbosus* and *Leucanthemum vulgare* common in our pastures because the cattle suffer them to go to seed. In vacant lots about our cities we have *Stramonium*, may-weed and many other plants progressing with amazing rapidity simply because not even the half-starved cattle of the "poor man" will pasture on them. But if an introduced plant can flower and fruit close to the earth, where some seed may mature though cattle eat the tops, it may survive and spread in spite of its being a good morsel for a hungry beast. Hence the *Lespedeza striata*, or Japan clover, has taken possession of immense territory in the South, because numerous seed-vessels mature close to the ground, between the crevices of rocks, or underneath loose stones, where cattle cannot get at them. If this were an erect instead of a prostrate plant, and did not flower till several inches high, it could not survive in a grazing country. There is no adaptation of the plant to the circumstances—the fitness is in the accident which came at the proper time to destroy or to save it.

In some gardens-weeds the accident is the early flowering. Chick-weed, *Draba verna*, *Arabis Thaliana*, the shepherd's purse, and many other things are common in Pennsylvania gardens solely because they mature so very early in spring that seed is perfected before the gardener commences to use the hoe. When he begins this branch of cultivation the earth is full of seed for the next year's crop. If they flowered a month later than they do, they would soon be among rare plants, instead of being the common weeds they are. In a part of my grounds I have what I term my "botanical patch." There I sow every "weed" I can get from any part of the earth. Some escape, and I often enjoy noting how their peculiar characters fit them to spread without any modification of character to enable them to advance. Some four years ago, I had in this botanical border the pretty Siberian *Nonea rosea*. It matures its seeds sometimes in the early part of April with me. I am so situated that our serious attack on weeds seldom commences before the end of May. The *Nonea* has now spread and is not uncommon in many parts, and it is quite pleasant to note it struggling with, and successfully holding its own against, the *Thlaspi*, *Arabis* and other immigrants that have before ventured to regard the soil as their own. Having the broadest leaves and the rankest growth, it is of course more "fitted to survive" in its battle with the two named and similar others. But we may now bring in speculation and say "if" the *Arabis* should grow stronger—"if" the leaves should get broader—"if" the plant should flower earlier—"if" many other points which would be an advantage to the *Arabis* in the struggle should occur, these superior plants would produce a race which might in time crowd down the *Nonea*. Of course; but "if"

the *Nonea* grew also the stronger for its struggle, the battle would still be about equal, until an "if" in the shape of some such an accident as I have above illustrated should come in to the advantage of the victor.

It seems to me that there is another side to the subject of the "survival of the fittest" that we seldom have presented to our view.

THOMAS MEEHAN.

Note on *Dicentra*.—I find that in my garden the flowers of *Dicentra cucullaria* are systematically punctured by humble-bees; I have watched them in the process. Has this been noticed when the plants are growing wild? It sadly interferes with the very neat mechanism for cross-fertilization.

Providence, May 1, 1884.

W. WHITMAN BAILEY.

Abnormal Hepaticas.—The blossoming of *Anemone Hepatica* in Ross Park, near this city, this spring, is very varied and profuse. Among the myriads of plants, I have noticed the following abnormalities:

(1) Dozens of plants have very deep blue sepals with a white or light blue margin. All of these are absolutely stamenless, though pollen was found upon the stigmas, whither it must have been brought by insects.

(2) Numbers of flowers were pure white, and all of these had nine sepals and bore—as far as the flowers were concerned—an exact resemblance to *A. nemorosa*. One *monosepalous* flower was found with six lobes, one of which was cleft to its centre, thus forming, with a stameniferous extra sepal, nearly an 8-sepaled specimen.

Binghampton, N. Y.

C. F. MILLSPAUGH.

Tribute of Respect to Dr. Engelmann.—The following preamble and resolutions, indicative of the appreciation of the high scientific and personal character of the late Dr. George Engelmann, were unanimously adopted by the Botanical Section of the Academy of Natural Sciences of Philadelphia, April 14th, 1884,

WHEREAS, the Botanical Section of the Academy of Natural Sciences of Philadelphia has heard with profound regret of the death of Dr. George Engelmann; therefore

Resolved: We regard this as a calamity to Botanical Science and to those who were in any way associated with him in its study; also

Resolved: That in his life he furnished an example of industry in his profession, of devotion to science, of thoroughness in investigation, and of success in labor which will always command our admiration and respect; and be it further

Resolved: That by his readiness to aid all who were seekers after the truths of nature, by the conscientious answers to the botanical questions referred to him, no less than by his goodness as a man, we believe he has attached many to the science in whose service he died.

Resolved: That as a mark of respect to the memory of the deceased, these resolutions be entered upon the minutes of the Section, a copy be transmitted to his family, and also a copy of them